

REMARKS

The above amendment with the following remarks is submitted to be fully responsive to the Official Action of October 15, 2004. Reconsideration of this application in light of the amendment and the allowance of this application are respectfully requested.

Claims 12-19 and 21-35 were pending in the present application prior to the above amendment. In response to the Office Action, independent claims 12, 34, and 35 have been amended, and new claim 36 has been added. Therefore, claims 12-19, and 34-36 are pending in the present application and are believed to be in proper condition for allowance.

Referring now to the Office Action, the Examiner objected to the drawings asserting that they do not show each and every feature of the claims. In particular, the Examiner notes that claim 12 recites a combustion chamber, internal combustion engine, an injector bore and a cylinder head which must be shown in the drawings. In response thereto, claim 12 has been amended above to omit references to the combustion chamber and an internal combustion engine in the body of the claim. However, it is respectfully noted that the drawings filed already shown an injector bore and a cylinder head. Examiner's attention is directed towards Figures 2 to 6, each showing a cylinder head 2 with an injector bore in which the fuel injector is received and coolant jacket 6 is provided. (See specification, ¶ [0027], [0032], [0034], [0037] and [0039]). Therefore, the withdrawal of this rejection is requested.

In addition, claims 12-19, 34 and 35 were rejected under 35 U.S.C. 112, second paragraph. Independent claim 12 was rejected due to the positive recitation of the combustion chamber and the cylinder head. In response thereto, independent claim 12 has been amended delete positive recitation of these elements. Claim 34 and 35 were rejected for use of the term "fuel injector components". This term has been deleted in the above amendment claims 34 and 35. Therefore, the withdrawal of this rejection relative to claims 12-19, 34 and 35 are respectfully requested.

Referring again to the Office Action, claims 12, 19, 34 and 35 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,053,432 to Stevens. As discussed in response to the prior Office Action, Stevens discloses a fuel injector including

a nozzle body, a bore that slidably receives a needle valve, and a collar extending around part of the nozzle body which restricts dilation or enlarging of the bore in at least part of the guide region. The collar disclosed in Stevens prevents dilation of the nozzle body which is caused by the application of high pressure fuel, and the reference specifically discloses that the collar serves to maintain the concentric positioning of the needle relative to the seat. (See column 3, lines 14-33). As previously argued, Stevens provides a solution for solving a mechanical deformation problem associated with the high pressure fuel that is injected by the fuel injector, and does not relate at all to improving the cooling characteristics of the fuel injector which is the problem addressed by the present invention.

In this regard, the Examiner's attention is again directed to the marked up copy of the sole figure of Stevens in which a significant gap is present between the shank of the nozzle body 10 and the cap nut 19. The Examiner's comments that the rejection is premised in the interference fit between element 18 and element 10 of Stevens is not understood. As shown in the submitted marked up figure, Stevens still allow for a significant gap around the nozzle body in which combustion gas can enter. Therefore, contrary to the Examiner's assertion, Stevens fails to disclose a closed nozzle fuel injector with improved cooling as recited in the present claims, and the withdrawal of this rejection is requested.

However, to more clearly define the present invention and to expedite prosecution of the present application, independent claims 12, 34 and 35 has been specifically amended to recite that the integral nozzle shank and the nozzle support portion define an engagement opening therebetween, and that an interference fit exists at a seal interface adjacent the tip of the nozzle shank to prevent combustion gas from entering the engagement opening. Clearly, Stevens reference fails to disclose, teach, or otherwise suggest these features, even when the collar and/or the nozzle body of Stevens are interpreted in the manner suggested by the Examiner. Therefore, the withdrawal of this rejection relative to claims 12, 19, 34 and 35 are respectfully requested.

Referring again to the Office Action, claims 13, 14, 16 and 17 were rejected under 35 U.S.C. as being unpatentable over Stevens discussed above. However, this rejection is believed to be rendered moot in view of the above amendments to independent claim 12, Stevens failing to teach or otherwise suggest the fuel injector as claimed.

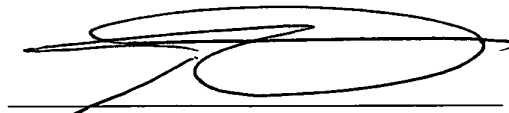
Correspondingly, the withdrawal of this rejection and the allowance of claims 13, 14, 16 and 17 are respectfully requested.

Claims 12, 15 and 18 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,000,638 to Martin in view of Stevens discussed above. As discussed in the response to the previous Office Action, Martin discloses an apparatus for strengthening the injector tip member in which the tip member includes a further member 186 that annular surrounds the tip of the fuel injector, thereby minimizing the possibility of fracture or other failure of the injector tip. In a manner similar to Stevens reference discussed above, Martin reference addresses the problem of mechanical strength of the injector tip so as to prevent failure by increasing the structural rigidity, and is not related to improved cooling. Moreover, even if Stevens and Martin are combined in the manner suggested by the Examiner, they still fail to result in a fuel injector as now recited in the amended claim 12. Therefore, the withdrawal of this rejection and the allowance of claims 12, 15, and 18 are respectfully requested.

New claim 36 has been added to further define the present invention.

In view of the foregoing, it is submitted that the present application is in condition for allowance and a notice to that effect is respectfully requested. However, if the Examiner deems that any issue remains after considering this response, he is invited to call the undersigned to expedite the prosecution and work out any such issue by telephone.

Respectfully submitted,



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